

## **REMARKS**

### **I. INTRODUCTORY REMARKS**

The Applicant thanks the Examiner for the careful consideration of this application. The Office Action dated August 18, 2010 has been received and its contents carefully considered. Applicant amends claims 1, 3 and 4. Claims 2, 5, and 6 are cancelled. Applicant adds new independent claims 14 and 15 which are fully supported in the specification as filed. Claims 1, 3, 4 and 7-15 are currently pending in this application. Claims 1, 3, 14, and 15 are the independent claims. Based on the foregoing amendments and the following remarks, the Applicant respectfully requests that the Examiner reconsider all outstanding rejections and that they be withdrawn.

### **II. PROSECUTION REOPENED**

On page 2, the Office Action notes that “PROSECUTION IS HEREBY REOPENED.” Applicant thanks the Examiner for the re-opening of prosecution. In order to avoid abandonment of the application, Applicant hereby replies under 37 C.F.R. § 1.111 to the non-final Office Action of August 18, 2010.

### **III. CLAIM REJECTIONS UNDER 35 U.S.C. § 103(A)**

On page 3 of the Office Action, claims 1, 3, 4 and 7-13 are rejected under 35 U.S.C. § 103(a) as being obvious over JP-2002-127948 to Ishii in view of Silicon Processing for VLSI Era Volume 1 by Wolf et al and further in view of U.S. Patent No. 6,689,498 to Shinosawa. On page 8, the Action rejects claim 6 under 35 U.S.C. § 103(a)

as being obvious over Ishii in view of Wolf and Shinosawa, and further in view of U.S. Publication No. 2002/0171089 to Krames. The Applicant respectfully traverses this rejection. Applicant submits the claims are allowable over the cited references for at least the following reasons.

**A. CLAIM 1**

*First*, no reasonable combination of Ishii, Wolf, and Shinosawa discloses or renders obvious “a metal film formed on a surface of said substrate, formed from **Ag alone**” as recited in amended claim 1. The Action aligns the claimed metal film with “paragraph 60: ‘mainly of Au’; hence, an alloy of mostly Au” of Ishii (Action, page 3). Ishii fails to disclose or render obvious “a metal film formed on a surface of said substrate, formed from **Ag alone**” as recited in amended claim 1. Wolf and Shinosawa likewise fail to remedy at least this deficiency of Ishii. Accordingly, no reasonable combination of Ishii, Wolf, and Shinosawa discloses or renders obvious “a metal film formed on a surface of said substrate, formed from **Ag alone**” as recited in amended claim 1. Hence, claim 1 is patentable over the cited art for at least a first reason.

*Second*, no reasonable combination of Ishii, Wolf, and Shinosawa discloses or renders obvious “said surface of said metal film has a center-line average roughness Ra of no more than 0.1  $\mu\text{m}$ ,” as recited in amended claim 1. The Action provides that “Ishii discloses everything except for certain specific material properties of ‘metal film’” and to overcome the failings of Ishii asserts that “Wolf and Shinosawa teach such material properties” (Action, page 4). Applicant respectfully disagrees as noted below.

Conversely, Wolf fails to disclose or render obvious “said surface of said metal film has a center-line average roughness Ra of no more than 0.1  $\mu\text{m}$ ,” as recited in amended claim 1. Rather, Wolf simply describes “Larger grains are expected for increased substrate and annealing temperatures as a result of the increased surface mobility” (Wolf, page 106, last line). Wolf further provides “For high deposition rates, the heat of condensation can raise the substrate temperature (thereby producing increased grain size from thermal effects)” (Wolf, page 107, lines 5-6). The Action provides that there are two methods “stated by applicant in his disclosure for achieving his particle diameter and roughness specs; hence, these results are **inherent** in the application of Wolf’s teaching by applicant’s own disclosure” (Action, page 4). Applicant respectfully submits that the results are **not inherent** in the teachings of Wolfe and that Wolf fails to disclose or render obvious “said surface of said metal film has a center-line average roughness Ra of no more than 0.1  $\mu\text{m}$ ,” as recited in amended claim 1.

Further, Applicant respectfully directs the Office's attention to § 2112 of the MPEP with respect to the inherency argument. This section provides, "To establish inherency, the extrinsic evidence must make **clear** that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however may not be established by probabilities or possibilities. **The mere fact that a certain thing may result from a given set of circumstances is not sufficient**" (Emphasis added). Applicant respectfully submits that the burden of proof for an inherency argument with respect to Wolf has not been met. The Action's minimal justifications that the results are inherent in the application of Wolf’s teaching by applicant’s own disclosure fails to provide the

necessary evidence to meet such burden. Accordingly, Wolf fails to disclose or render obvious “said surface of said metal film has a center-line average roughness Ra of no more than 0.1  $\mu\text{m}$ ,” as recited in amended claim 1.

Hence, no reasonable combination of Ishii, Wolf, and Shinosawa discloses or renders obvious “said surface of said metal film has a center-line average roughness Ra of no more than 0.1  $\mu\text{m}$ ,” as recited in amended claim 1.

*Third*, no reasonable combination of Ishii, Wolf, and Shinosawa discloses or renders obvious “said surface of said metal film has a center-line average roughness Ra of no more than 0.1  $\mu\text{m}$ ,” as recited in amended claim 1. The Action provides that “Ishii discloses everything except for certain specific material properties of ‘metal film’” and to overcome the failings of Ishii asserts that “Wolf and Shinosawa teach such material properties” (Action, page 4). Applicant respectfully disagrees as noted below.

Shinosawa fails to remedy the deficiencies of Ishii and Wolf and likewise fails to disclose or render obvious “said surface of said metal film has a center-line average roughness Ra of no more than 0.1  $\mu\text{m}$ ,” as recited in amended claim 1 (Emphasis added). Rather, Shinosawa describes a roughness of a substrate (Shinosawa, Abstract).

Shinosawa provides “In the aluminum nitride substrate, a surface thereof is machined so that arithmetic average roughness Ra is 0.5  $\mu\text{m}$  or less” (Shinosawa, Abstract).

Shinosawa lacks any teaching regarding the roughness Ra of a metal film. Further, if Ishii and Shinosawa are combined, one of ordinary skill would modify the aluminum nitride (AlN) substrate 4 of Ishii (Ishii, Figure 1; column 2, paragraph [0049]) to be an aluminum nitride (AlN) substrate having an arithmetic average roughness Ra of 0.5  $\mu\text{m}$  or less, as taught by Shinosawa (Shinosawa, Abstract). Accordingly, Shinosawa fails to

disclose or render obvious “said **surface of said metal film** has a center-line average roughness Ra of no more than 0.1  $\mu\text{m}$ ,” as recited in amended claim 1.

Accordingly, no reasonable combination of Ishii, Wolf, and Shinosawa discloses or renders obvious “said surface of said metal film has a center-line average roughness Ra of no more than 0.1  $\mu\text{m}$ ,” as recited in amended claim 1. Hence, claim 1 is allowable over the cited references for at least a second reason. Applicant respectfully requests reconsideration and withdrawal of this rejection.

**B. CLAIM 3**

Applicant amends claim 3 into independent form. The amendments to claim 3 are fully supported in the specification as filed and at least at page 18, line 7 through page 19, line 3 of the specification. Applicant respectfully submits that claim 3 recites similar features as claim 1 and is allowable over the cited references for at least the same reasons as claim 1.

In addition, no reasonable combination of Ishii, Wolfe, and Shinosawa discloses or renders obvious, “a metal film formed on a surface of said substrate, formed from at least one of **Ag alloy** or **Al alloy**, wherein the Ag alloy or the Al alloy includes **other metal**, a **proportional content** of said other metal being 0.001 – **5** percent by weight” and “the thickness of the metal film is **0.5 - 3  $\mu\text{m}$** ” as recited in claim 3 (Emphasis added). The Action aligns the claimed “**said other metal**” with paragraph [0064] of Ishii but does not sufficiently align the “Ag alloy or Al alloy” with a sufficient feature. The Action provides that “paragraph 64 specifies the range of layer thicknesses for layers 6, 7a & 7b; the ranges of the layer thicknesses are sufficiently broad to allow it to meet the

requirement of ‘**said other metal**’ being 0.001-10 percent by weight” by an overlapping range.” The Action however is silent with respect to the “Ag alloy or Al alloy” of the claim.

Rather, the Action further provides that Ishii discloses layer 6 of Ishii as “mainly Au” (Action, page 6). Applicant notes that a silver (**Ag**) alloy or an aluminum (**Al**) alloy are different from a mainly gold (**Au**) layer. The **mainly gold** (Au) layer of Ishii is **not** with a film “formed from at least one of **Ag alloy** or **Al alloy**,” as recited in claim 3 (Emphasis added). Accordingly, the Action **fails** to align the “at least one of Ag alloy or Al alloy” with a sufficient feature of the recited references.

Ishii, Wolfe, and Shinosawa are silent with respect to metal films “formed from at least one of **Ag alloy** or **Al alloy**” and “the thickness of the metal film is 0.5 - 3  $\mu\text{m}$ ” as recited in amended claim 3. Applicant maintains the arguments presented in the Appeal Brief in VII. D. No reasonable combination of Ishii, Wolfe, and Shinosawa discloses or renders obvious, “a metal film formed on a surface of said substrate, formed from at least one of **Ag alloy** or **Al alloy**, wherein the Ag alloy or the Al alloy includes **other metal**, a **proportional content** of said other metal being 0.001 – 5 percent by weight,” as recited in claim 3 (Emphasis added). Applicant respectfully requests reconsideration and withdrawal of this rejection.

### C. CLAIMS 4 and 7-13

Claims 4 and 7-13 depend variously from independent claims 1 and 3 and overcome the §103(a) rejection for at least the same reasons. Reconsideration and

withdrawal of the rejection is respectfully requested in view of the foregoing amendments and remarks.

**D. CLAIM 6**

Applicant herewith cancels claim 6. Accordingly, Applicant regards the rejection to claim 6 as moot. Reconsideration and withdrawal of the rejection is respectfully requested.

**IV. NEW CLAIM 14**

New independent claim 14 provides, “metal film formed on a surface of said substrate, formed from Al alone.” Applicant respectfully submits that new claim 14 is fully supported in the specification and that claim 14 is allowable over the references of record. Claim 14 also recites similar features as claim 1 and is allowable over the references of record for at least the same reasons.

**V. NEW CLAIM 15**

New independent claim 15 provides, “a pair of metal films formed on a surface of said substrate, formed from Ag by itself, Al by itself, an Al alloy, or an Ag alloy.” Moreover, the cited references fail to disclose or recite, “the pair of metal films are separated by a gap above the substrate, wherein the pair of metal films are adapted to have the semiconductor light-emitting element mounted above the gap.” Applicant respectfully submits that new claim 15 is fully supported in the specification and that

claim 15 is allowable over the references of record. Claim 15 also recites similar features as claim 1 and is allowable over the references of record for at least the same reasons.

**VI. CONCLUSION**

All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant, therefore, respectfully requests that the Examiner reconsider all presently outstanding rejections and that they be withdrawn. Applicant believes that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is hereby invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment is respectfully requested.

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Respectfully submitted,

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